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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,347	01/31/2002	Hideki Ozawa	054160-5059	6053

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EXAMINER

BOYD, JENNIFER A

ART UNIT PAPER NUMBER

1771

DATE MAILED: 05/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

<b>Office Action Summary</b>	<b>Application No.</b> 10/059,347	<b>Applicant(s)</b> OZAWA ET AL.	
	<b>Examiner</b> Jennifer A Boyd	<b>Art Unit</b> 1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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**DETAILED ACTION**

***Response to Amendment***

1. The Applicant's Amendments and Accompanying Remarks, filed February 6, 2004, have been entered and have been carefully considered. Claims 1- 14 are withdrawn, claims 15, 18, 21 and 22 are amended and claims 15 – 27 are pending. In view of Applicant's Amendments, the Examiner withdraws the 35 U.S.C. rejections as set forth in paragraphs 2 – 5 of the previous Office Action dated 11/12/2003. In view of the Applicant's Amendments, the Examiner withdraws rejection as set forth in paragraph 8 of the previous Office Action dated 11/12/2003. However, after an updated search, additional prior art has been found which renders the invention as currently claimed unpatentable.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 112***

3. Claims 21 – 24 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 25 is rejected as being dependent on a rejected claim.

4. Claims 21 - 22 recites the limitation "an impregnated sheet-like material" in the preamble. There is insufficient antecedent basis for this limitation in the claim. The Examiner suggests to make the preamble clause language consistent among claims 15 – 22.

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5. Regarding claims 21 – 24 and 26, the phrase "sheet-like" renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "or the like"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

***Claim Rejections - 35 USC § 102/103***

6. Claims 15 – 17, 23 and 26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamamoto et al. (US 5,260,412).

Yamamoto is directed to a terminal-modified imide oligomer composition (Title) useful in preregs for aircraft, machines and vessels for the space industry, printed-wiring boards, and machines and vessels in the electronics field (column 1, lines 35 – 40).

As to claims 15 and 23, Yamamoto teaches that the terminal-modified imide composition solution can be impregnated into reinforcing fibers (column 6, lines 64 – 69). Yamamoto teaches that the terminal-modified imide composition has a secondary transition temperature, or glass transition temperature, of 250°C or more (column 8, lines 15 – 23). Yamamoto teaches that reinforcing fibers can comprise aromatic polyamide, silicon carbide and/or alumina fibers, which are known in the art to be heat-resistant fibers.

As to claim 16, Yamamoto teaches that the terminal-modified imide composition has a secondary transition temperature, or glass transition temperature, of 250°C or more (column 8, lines 15 – 23). It is known in the art that a glass transition temperature indicates the presence of at least a partially amorphous material.

As to claim 17, Yamamoto teaches that the terminal-modified imide composition can comprise 2,3,3',4'-biphenyltetracarboxylic acid (column 3, lines 20 – 45). Yamamoto teaches

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that the 2,3,3',4'-biphenyltetracarboxylic acid may have a part thereof, not more than 30 mol.%, substituted with any other of the aromatic tetracarboxylic acids (column 3, lines 44 – 50); therefore, it is assumed that does not suggest the combination of two or more tetracarboxylic acid dianhydride materials, therefore, it is assumed that at least 70 mol % comprises 2,3,3',4'-biphenyltetracarboxylic acid.

As to claim 26, Yamamoto teaches that terminal-modified imide oligomer composition can be adhered to a metallic foil (column 8, lines 15 – 25).

As to claims 15 and 23, although Yamamoto does not explicitly teach the claimed retaining at least 70% of its tensile strength when left in an environment at 200 degrees Celsius for one hour as required by claim 15 and a polyimide with a thermal decomposition temperature of 500 degrees Celsius or higher and a breaking elongation of 15% or greater when shaped into a film as required by claim 23, it is reasonable to presume that the heat-resistant fiber impregnated material retains at least 70% of its tensile strength when left in an environment at 200 degrees Celsius for one hour is inherent to Yamamoto. Support for said presumption is found in the use of like materials (i.e. a heat resistant fiber polyimide-impregnated material) which would result in the claimed property. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property of that the heat-resistant fiber impregnated material retains at least 70% of its tensile strength when left in an environment at 200 degrees Celsius for one hour as required by claim 15 and a polyimide with a thermal decomposition temperature of 500 degrees Celsius or higher and a breaking elongation of 15% or

greater when shaped into a film as required by claim 23 would obviously have been present once the Hashimoto product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

***Claim Rejections - 35 USC § 103***

7. Claims 18 – 22, 24 – 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (US 5,260,412) in view of Hashimoto et al. (US 2002/0106521 A1).

Yamamoto is directed to a terminal-modified imide oligomer composition (Title) useful in preregs for aircraft, machines and vessels for the space industry, printed-wiring boards, and machines and vessels in the electronics field (column 1, lines 35 – 40).

As to claim 18, Yamamoto teaches that the terminal-modified imide composition solution can be impregnated into reinforcing fibers (column 6, lines 64 – 69). Yamamoto teaches that the terminal-modified imide composition has a secondary transition temperature, or glass transition temperature, of 250°C or more (column 8, lines 15 – 23). Yamamoto teaches that reinforcing fibers can comprise aromatic polyamide, silicon carbide and/or alumina fibers, which are known in the art to be heat-resistant fibers.

As to claim 19, Yamamoto teaches that the terminal-modified imide composition solution can be impregnated into reinforcing fibers (column 6, lines 64 – 69). Yamamoto teaches that the terminal-modified imide composition has a secondary transition temperature, or glass transition temperature, of 250°C or more (column 8, lines 15 – 23). Yamamoto teaches that reinforcing fibers can comprise aromatic polyamide, silicon carbide and/or alumina fibers, which are known in the art to be heat-resistant fibers.

As to claim 20, Yamamoto teaches that the terminal-modified imide composition can comprise 2,3,3',4'-biphenyltetracarboxylic acid (column 3, lines 20 – 45). Yamamoto teaches that the 2,3,3',4'-biphenyltetracarboxylic acid may have a part thereof, not more than 30 mol %, substituted with any other of the aromatic tetracarboxylic acids (column 3, lines 44 – 50); therefore, it is assumed that does not suggest the combination of two or more tetracarboxylic acid dianhydride materials, therefore, it is assumed that at least 70 mol % comprises 2,3,3',4'-biphenyltetracarboxylic acid.

As to claim 21, it should be noted that “further impregnating” is a process limitation. The process of “further impregnating” is not germane to the issue of patentability of the composition itself. It should be noted that because all structural limitations have been met, the process of “further impregnating” has not been given patentable weight.

As to claim 22, Yamamoto teaches that the terminal-modified imide composition comprises a tetracarboxylic dianhydride component that comprises at least 70 mol % of 2,3,3',4'-biphenyltetracarboxylic acid (column 3, lines 20 – 50). Yamamoto does not suggest the combination of 2,3,3',4'-biphenyltetracarboxylic acid and 3,3',4,4'-biphenyltetracarboxylic dianhydride, therefore, it is assumed that, in one embodiment, 100% of the tetracarboxylic acid dianhydride component comprises 2,3,3',4'-biphenyltetracarboxylic acid dianhydride and 0% comprises 3,3',4,4'-biphenyltetracarboxylic dianhydride. Yamamoto teaches that the aromatic diamine component can comprise 1,3-bis(4-aminophenoxy) benzene and/or 1,3-bis(3-aminophenoxy) benzene (column 4, lines 15 – 30). It should be noted that the Applicant requires that the composition comprises 0 – 90 mol % of at least one of p-phenylenediamine and/or diaminodiphenylether. Therefore, in one embodiment, Yamamoto teaches the presence of 100

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mol % of 1,3-bis(4-aminophenoxy) benzene and/or 1,3-bi(3-aminophenoxy) benzene and 0 mol % of p-phenylenediamine and/or diaminodiphenylether.

As to claim 24, Yamamoto teaches that the terminal-modified imide oligomer composition can be adhered to a metallic foil (column 8, lines 15 – 25).

As to claim 18, Yamamoto fails to teach that the terminal-modified imide composition solution impregnated into the reinforcing fiber comprises 1,2-dimethylimidazole and/or 1-methyl-2-ethylimidazole. As to claims 25 and 27, Yamamoto fails to teach that the metallic foil can be copper.

Hashimoto et al. is directed to a thermosetting resin low-dielectric resin composition (Title) suitable for circuit laminate material (page 1, [0003]). Hashimoto teaches that a prepreg can be formed of a reinforcing fiber material impregnated with the resin composition (page 7, [0065]), which can serve as a binder for the heat-resistant fibers (page 7, [0062]).

Hashimoto teaches a thermosetting low-dielectric polyimide resin composition comprising a tetracarboxylic acid dianhydride and diamine or diisocyanate (page 5, [0044]). Hashimoto teaches that a prepreg can be formed of a reinforcing fiber material impregnated with the resin composition (page 7, [0065]), which can serve as a binder for the heat-resistant fibers (page 7, [0062]). Hashimoto teaches that the siloxane-modified polyimide resin composition can additionally contain a reaction promoter for use during drying or curing under heat comprising 1,2-dimethylimidazole or 1-methyl-2-ethylimidazole (page 7, [0062]). Hashimoto teaches a metal film, specifically a copper film, can be applied to the resin surface (page 8, [0073]).



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It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the reaction promoter comprising 1,2-dimethylimidazole or 1-methyl-2-ethylimidazole of Hashimoto in the terminal-modified imide composition solution of Yamamoto motivated by the desire to accelerate or boost the reaction upon curing.

Since Yamamoto lacks disclosure to specific metallic foils, it would have been necessary and thus obvious for one of ordinary skill in the art practicing the invention of Yamamoto to look to the prior art as exemplified by Hashimoto to provide the details of the metallic foil. As copper film has high conductivity and, therefore, would be highly suitable for circuit board laminates, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a copper film as the metallic foil in the invention of Yamamoto motivated by the expectation of successfully practicing the invention of Yamamoto.

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 15 - 27 have been considered but are moot in view of the new ground(s) of rejection.

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***Conclusion***


9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A Boyd whose telephone number is 571-272-1473. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jennifer Boyd

April 28, 2004



**Ula C. Ruddock**  
Primary Examiner  
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